

S.C.

Notice of Allowability	Application No.	Applicant(s)	
	09/990,604	BRADY ET AL.	
	Examiner	Art Unit	
	Daniel S. Metzmaier	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment of 20 April 2004 & interview of 06 May 2004.
2. ☒ The allowed claim(s) is/are 1-3, 8-15 and 17-24.
3. ☒ The drawings filed on 21 November 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>05062004</u> . |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>12082003</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

EXAMINER'S AMENDMENT

Claims 1-3, 8-15 and 17-24 are allowed.

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Bradford B. Wright on 06 May 2004.

The application has been amended as follows:

Replace the pending claims with those as follows:

1. (Previously Presented) A composition comprising a plurality of Ti/Sb mixed oxide nanoparticles in the form of an aqueous colloidal dispersion, wherein the Ti/Sb mixed oxide nanoparticles comprise a rutile-like crystalline phase, wherein the ensemble average rutile-like crystalline phase content of the Ti/Sb mixed oxide nanoparticles is at least 20 weight percent, and wherein the weight ratio of antimony to titanium in the Ti/Sb mixed oxide nanoparticles is in a range of from at least 0.42 up to and including 2.93.

2. (Original) The composition of claim 1, wherein the ensemble average nanoparticle size is less than about 100 nanometers.

3. (Original) The composition of claim 1, wherein the ensemble average nanoparticle size is less than about 40 nanometers.

Claims 4 - 7 (Canceled).

8. (Previously Presented) The composition of claim 1, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least 40 weight percent.

9. (Previously Presented) The composition of claim 1, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least 60 weight percent.

10. (Previously Presented) The composition of claim 1, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least 80 weight percent.

11. (Original) The composition of claim 1, wherein substantially all of the Ti/Sb mixed oxide nanoparticles contain a rutile-like crystalline phase,

12. (Previously Presented) The composition of claim 1, wherein the ensemble average rutile-like crystallite size is less than 20 nanometers.

13. (Previously Presented) The composition of claim 1, wherein the ensemble average rutile-like crystallite size is less than 15 nanometers.

14. (Original) The composition of claim 1, wherein the nanoparticles have at least one organic moiety bound to the nanoparticle surface.

15. (Currently Amended) A method for preparing an aqueous colloidal dispersion of Ti/Sb mixed oxide nanoparticles comprising the steps of:

- a) providing an aqueous titania precursor, wherein the aqueous titania precursor is the reaction product of hydrogen peroxide with a titanium alkoxide;
- b) providing an aqueous antimony oxide precursor;
- c) combining with mixing both aqueous precursors; and
- d) hydrothermally processing the mixture;

wherein the weight ratio of antimony to titanium is in the range of from about 0.42 to about 2.93, and

wherein the ensemble average rutile-like crystalline phase content of the Ti/Sb mixed oxide nanoparticles is at least 20 weight percent.

16. (Canceled).

17. (Previously Presented) The method of claim 15, wherein the titanium alkoxide is titanium tetraisopropoxide.

18. (Previously Presented) The method of claim 15, wherein the aqueous antimony oxide precursor is selected from a reaction product of an antimony alkoxide with hydrogen peroxide and colloidal HSb(OH)_6 .

19. (Original) The method of claim 18, wherein the aqueous antimony oxide precursor is colloidal HSb(OH)_6 .

20. (Original) The method of claim 15, further comprising the step of modifying the surface of the nanoparticles.

21. (Original) The method of claim 15, wherein the pH of the mixture is between about 5 and about 8.

22. (Original) The method of claim 15, further comprising the step of centrifuging the hydrothermally processed mixture.

23. (Original) The method of claim 15, wherein hydrothermally processing comprises passing the mixture through a stirred tube reactor.

24. (Original) The method of claim 23, further comprising the step of centrifuging the hydrothermally processed mixture.

Claims 25 - 69 (Canceled).

Reasons for allowance

2. The following is an examiner's statement of reasons for allowance: the prior art does not disclose or fairly suggest the claimed aqueous colloidal dispersions and methods of making having the claimed Ti/Sb ratio and having the average rutile-like crystalline phase content as claimed. Regarding the term "rutile-like", attention is directed to page 10 of the response filed December 8, 2003 and page 3, lines 16-17, of the instant specification.

Newly cited Sato et al lacks at least the ratio of antimony to titanium, a hydrothermal treatment process step and the formation of a rutile-like crystalline phase instantly claimed.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Metzmaier whose telephone number is (703) 308-0451. The examiner can normally be reached on 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Daniel S. Metzmaier
Primary Examiner
Art Unit 1712

DSM